



# A COMPARATIVE STUDY ON BAMBOO/COTTON & BAMBOO/POLYESTER BLENDED WOVEN FABRICS

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## ABSTRACT

The main aim of this research is to know about the resemblances and differences between natural, manmade and regenerated fabrics. This research is done by blending the two selected fibers, cotton and polyester with the regenerated fiber bamboo, then the blended yarn are weaved, wet processing and finished with Fragrance finish. And they are compared for various properties between the two finished fabrics, before and after laundering. On comparison it was clear that the bamboo/cotton fabrics showed certain, better geometrical, physical and mechanical properties; whereas bamboo/polyester fabrics showed, better comfort and absorbency properties. Bamboo fabrics are now a day's filling the vacancy in the textile material development in our textile production nation and these will inevitably stimulate the new fabric development through blending and finishing, among the cotton, wool and silk and bring the textile corporations a new opportunity.

## 1. INTRODUCTION:

Clothing is one among the most important three basic needs in every human life. It protects our body from various climates and gives us a good appearance says Vimala and Ramalakshmi (2008). Consumers are becoming increasingly very much conscious to environmental friendly consumer goods and much concerned about the green activities. This tendency for eco friendly come into contact with the skin for a prolonged period of the time says Dharani et al (2010).

Cotton is an important textile fiber for human clothing and certain other needs ever since the fiber of the cotton plant was first observed and identified for its potential and the art of hand spinning and its numerous other uses were identified says Ravindranath and Srinivasan (2009).

Bamboo is an important forest biomass resource. Bamboo textiles have many fanatics' properties when used as textile materials such as high tenacity, excellent thermal conductivity, resistant to bacteria, and high water and perspiration adsorption. Yarns of bamboo fiber provide the desirable properties of high absorbency, antibacterial and soft feel in textiles and made ups.

Bamboo textile products are having high demands in the market because of their antibacterial nature, biodegradable properties, high moisture absorption capacity, softness and UV protective capacity, breathability and fast drying behavior, bamboo fiber ensure comfort in various applications. Currently, regenerated bamboo fibers are used in apparels including undergarments, sports textile, t-shirts and socks. They are also suitable for hygienic products and sanitary napkins, absorbing pads, masks, bandages and surgical gowns (Saravanan et al., 2007; Prakash et al., 2011).

Bamboo can be spun purely or blended with other material such as cotton, hemp, silk, lyocell, and modal. Cotton has been one of the most human friendly plants with its soft, luxury and hygienic touch to the skin. The purpose of blending is to produce yarn with such qualities that cannot be obtained by using one type of fiber alone. Blending is also practiced for reasons of economic production, shortage of natural fiber, better performance in spinning, to improve the yarn strength, yarn evenness, imperfection level etc the combination bamboo and cotton proved as a supreme blends components for modern and luxurious life.

Polyester fibers are long chain polymers produced from elements derived from coal, air, water, and petroleum. As defined by the FTC, these fibers are chemically composed of "at least 85 percent by weight of an ester of a substituted aromatic carboxylic acid, but not restricted to substituted terephthalate units and para substituted hydroxybenzoate units."

The work of (W.H Carothers 2004), on linear fiber forming polymers put his initials effort on polyester by poly condensation method. The polyester was aliphatic polyesters, made from dibasic acids like adipic acids and glycols. The melting points of the polymers were below 100°C having molecular weight in the range of 2500-5000. It is only a short step onwards from him to J.R Whinfield and J.T. Dickson, who prepared the first high molecular weight, high melting polyester in 1940. This polymer is poly (ethylene terephthalate) or poly (oxyethylene oxy terephthaloyl) or simply PET.

## 2. MATERIALS & METHODS:

For the purpose of this study, the 100 percent Natural cotton, regenerated bamboo fiber and polyester fibers are chosen for this study. These fibers are blended

with different ratios like 65:35 Bamboo/Cotton and 65:35 Bamboo/Polyester and 30's count combed Bamboo/Cotton and Bamboo/Polyester are selected for weaving with Twill Weave Structure. The woven fabric are evaluated for various properties fabrics were scoured using caustic soda and bleached using universal bleaching agent hydrogen peroxide. The bleached fabrics were finished with Fragrance finish, after the selected fabrics were evaluated before and after study.

The fabrics were evaluated for various properties like Geometrical which includes EPI&PPI, thickness, GSM, Physical which includes Tensile Strength, Tearing Strength, Mechanical which includes Abrasion resistance and Bursting strength, Comfort properties like Crease Recovery, stiffness, Absorbency properties like Wickability test and Drop test, and washing.

## 3. RESULTS & DISCUSSION:

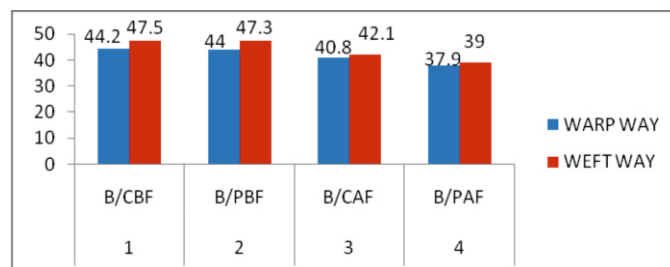
### 3.1 Geometrical Properties:

**3.1.1 EPI & PPI:** Bamboo/Cotton and Bamboo/Polyester samples were found to have equal number of warp, whereas Bamboo/Cotton samples were found to have the higher number of weft than Bamboo/Polyester samples in Before Finishing. After finishing, there was no difference in the warp and weft value, for both the Bamboo/Cotton and Bamboo/Polyester samples.

**3.1.2 Thickness and GSM:** Bamboo/Cotton and Bamboo/Polyester samples had higher thickness value before finishing, and there was no difference between the two samples after finishing. The Finished Bamboo/Cotton samples were found to have more GSM than Bamboo/Polyester samples.

### 3.2 Physical Properties:

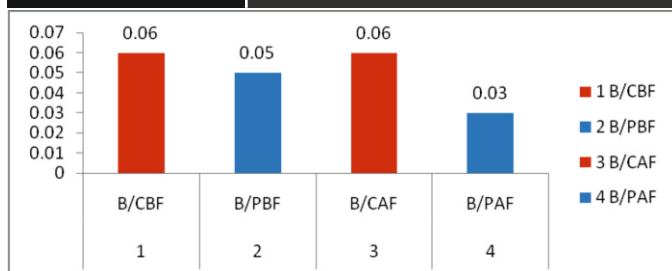
**3.2.1 Tensile Strength:** Bamboo/Cotton and Bamboo/Polyester warp and weft way samples were found to have equal Tensile strength value in before finishing. After Finishing Bamboo/Cotton samples showed the higher Tensile Strength than Bamboo/Polyester samples.



**3.2.2 Tearing strength:** Bamboo/Polyester warp and weft way samples were found highest Tearing strength value in before and after finishing than Bamboo/Cotton.

### 3.3 Mechanical Properties:

**3.3.1 Abrasion Resistance:** Bamboo/Cotton and Bamboo/Polyester samples had equal resistance against abrasion in Before Finishing. After Finishing Bamboo/Cotton samples showed the best resistance against abrasion than Bamboo/Polyester samples.

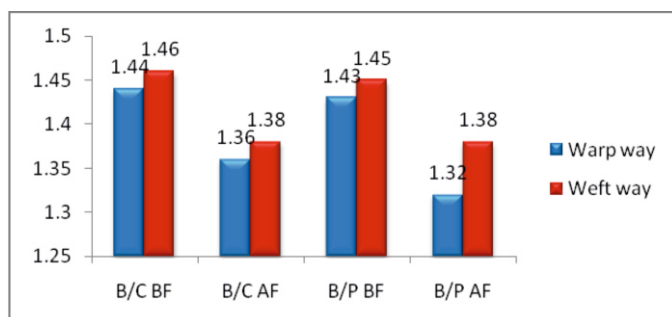


**3.3.2 Bursting Strength:** Bamboo/Polyester samples showed more strength against bursting than Bamboo/Cotton samples before and even after Finishing.

### 3.4 Comfort Properties:

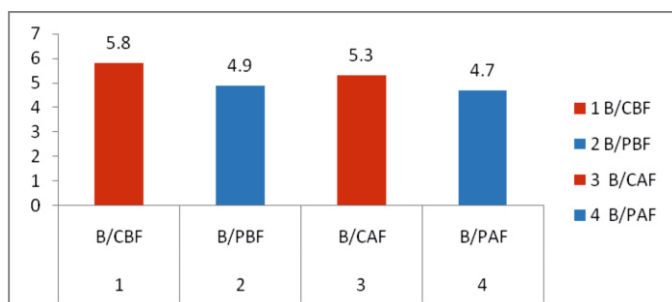
**3.4.1 Crease Recovery:** Bamboo/Polyester sample in warp and weft way had highest recovery than Bamboo/Cotton before after Finishing.

**3.4.2 Stiffness:** Both Bamboo/Cotton and Bamboo/Polyester samples showed highest Stiffness in warp and weft way in Before Finishing. After Finishing, in warp direction, Bamboo/Cotton samples were found to have the best Stiffness value than Bamboo/Polyester samples. But in weft direction, both Bamboo/Cotton and Bamboo/Polyester samples had no differences in stiffness value.



### 3.5. Absorbency Property

**3.5.1 Wickability:** Bamboo/Cotton samples had more absorbency than Bamboo/Polyester samples, even after Finishing.



**3.5.2 Performance Test:** Both Finished Bamboo/Cotton and Polyester showed good Fragrance property even after many washing.

## 4. CONCLUSION:

After the study it is concluded that bamboo/Cotton fabrics showed good geometrical properties. Bamboo/Cotton fabrics had better Tensile Strength in After Finishing. Bamboo/Cotton fabrics had better resistance against abrasion in After Finishing, whereas Bamboo/Polyester had good bursting strength. Bamboo/Polyester fabrics showed good recovery from crease. Bamboo/Cotton fabrics had good bending, and wicking properties. Both the Finished Bamboo/Cotton & Bamboo/Polyester fabrics showed good washing property. The search of natural, regenerated and manmade fabrics with many positive properties for the consumers who expect innovations in the Home textile and fashion industry has been achieved by this research.

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